



City of Round Rock, Texas

**Transportation Criteria Manual
Design and Construction Standards
(DACS)**

May 2018

Approved by City Council on 01-28-21

Transportation Criteria Manual

TABLE OF CONTENTS

SECTION 0 – GENERAL GUIDELINES

SECTION 1 – STREET DESIGN CRITERIA

SECTION 2 – TRAFFIC IMPACT ANALYSIS (TIA)

SECTION 3 – PAVEMENT DESIGN

SECTION 4 – SIDEWALKS, CURB RAMPS AND BICYCLE LANES

SECTION 5 – DRIVEWAY DESIGN AND ACCESS MANAGEMENT

SECTION 6 – TRAFFIC ENGINEERING

SECTION 7 – STRUCTURES IN THE RIGHT OF WAY AND IN EASEMENTS

SECTION 8 – BUS STOPS

SECTION 9 – PLAN PREPARATION AND PROJECT AUTHORIZATION

BIBLIOGRAPHY

GLOSSARY

LIST OF FIGURES

- FIGURE 1-1 TYPICAL SECTION LOCAL RESIDENTIAL STREET (L 52-30)
- FIGURE 1-2 TYPICAL SECTION TWO LANE LOCAL STREET WITH PARKING (L 61-39)
- FIGURE 1-3 TYPICAL SECTION TWO LANE COMMERCIAL COLLECTOR WITH ON STREET PARALLEL PARKING (C 70-41)
- FIGURE 1-4 TYPICAL SECTION THREE LANE COLLECTOR WITH OFF STREET SHARED PATH (C 70-39)
- FIGURE 1-5 TYPICAL SECTION TWO LANE COLLECTOR WITH DIAGONAL AND PARALLEL PARKING (C 80-52)
- FIGURE 1-6 TYPICAL SECTION THREE LANE COLLECTOR WITH OFF STREET SHARED PATH AND PARALLEL PARKING (C 80-53)
- FIGURE 1-7 TYPICAL SECTION THREE LANE COLLECTOR WITH OFF STREET SHARED PATHS AND PARALLEL PARKING (C 90-53)
- FIGURE 1-8 TYPICAL SECTION FOUR LANE ARTERIAL WITH OFF STREET SHARED PATH (A 110-54)
- FIGURE 1-9 TYPICAL SECTION FOUR LANE ARTERIAL WITH OFF STREET SHARED PATHS (A 120-54)
- FIGURE 1-10 TYPICAL SECTION SIX LANE ARTERIAL WITH OFF STREET SHARED PATH (A 135-76)
- FIGURE 1-11 TYPICAL SECTION SIX LANE ARTERIAL WITH OFF STREET SHARED PATHS (A 150-76)
- FIGURE 1-12 TYPICAL SECTION RESIDENTIAL REAR ALLEY (RA 20-15)
- FIGURE 1-13 DESIGN CRITERIA FOR ELBOW STREETS
- FIGURE 1-14 DESIGN CRITERIA FOR CORNER BUBBLE
- FIGURE 1-15 DESIGN CRITERIA FOR LOCAL CUL-DE-SAC
- FIGURE 1-16 DESIGN CRITERIA FOR COMMERCIAL CUL-DE-SAC
- FIGURE 1-17 DESIGN CRITERIA FOR INDUSTRIAL CUL-DE-SAC
- FIGURE 1-18 DESIGN CRITERIA FOR OPEN-ENDED CUL-DE-SAC
- FIGURE 1-19 MEDIAN BREAKS
- FIGURE 1-20 LEFT TURN CHANNELIZATION
- FIGURE 1-21 INTERSECTION SIGHT TRIANGLES

FIGURE 2-1 FLOW CHART FOR TRAFFIC IMPACT ANALYSIS

FIGURE 4-1: SIGN PLACEMENT ON SHARED USE PATHS

FIGURE 4-2: DROP-OFF HAZARDS FOR PEDESTRIANS AND BICYCLISTS

FIGURE 5-1: DESIGN CRITERIA FOR SEMICIRCULAR DROP-OFFS

FIGURE 5-2: DRIVEWAY PROFILES

FIGURE 6-1: EXAMPLE PHOTOMETRIC LAYOUT – LOCAL ROADWAY

FIGURE 6-2: EXAMPLE PHOTOMETRIC LAYOUT – COLLECTOR ROADWAY

FIGURE 6-3: EXAMPLE PHOTOMETRIC LAYOUT – ARTERIAL ROADWAY



City of Round Rock, Texas

**General Guidelines
Design and Construction Standards
(DACS)**

May 2018

TABLE OF CONTENTS

INTRODUCTION 0-3

SECTION 0.1 – DESIGN CRITERIA – GENERAL GUIDELINES 0-5

0.101 REFERENCE STANDARDS 0-5

0.102 SPECIFIC DESIGN CRITERIA..... 0-5

0.103 DESIGN EXCEPTIONS AND DESIGN WAIVERS 0-5

0.104 DESIGN VARIANCES (ADAAG/TAS) 0-6

0.105 DESIGN DOCUMENTATION FOR DESIGN EXCEPTIONS AND WAIVERS 0-7

0.106 PROJECT ENGINEER RESPONSIBILITIES..... 0-7

SECTION 0.2 – CONSTRUCTION – GENERAL GUIDELINES 0-7

0.201 PRE-APPROVED PRODUCTS LIST..... 0-7

0.202 AUTHORITY AND DEFINITIONS – TRANSPORTATION PROJECTS..... 0-8

0.203 PRE-CONSTRUCTION MEETING..... 0-8

0.204 CONTRACTOR SUBMITTALS AND WORKING DRAWINGS..... 0-8

0.205 CONSTRUCTION PLAN PREPARATION AND CHECKLISTS..... 0-10

INTRODUCTION

The purpose of this section of the Design and Construction Standards (DACS) is to serve as an introductory section to describe some general concepts that are important when developing projects in the City of Round Rock and its Extraterritorial Jurisdiction (ETJ).

The City's Strategic Plan outlines the goals, vision, and action agenda for its future. The DACS, which include Design Criteria Manuals, Specifications, and Construction Details, can accomplish this as follows:

- Standardize design and construction practices for projects in the City;
- Improve the quality and durability, while reducing maintenance costs for city utilities and roadways;
- Facilitate project delivery by outlining specific criteria and objectives for the various types of projects in the City; and,
- Improve coordination between the various departments and stakeholders engaged in development of City infrastructure projects.

Figure 1 represents the organization of the DACS including design criteria manuals, specifications, and reference documents.

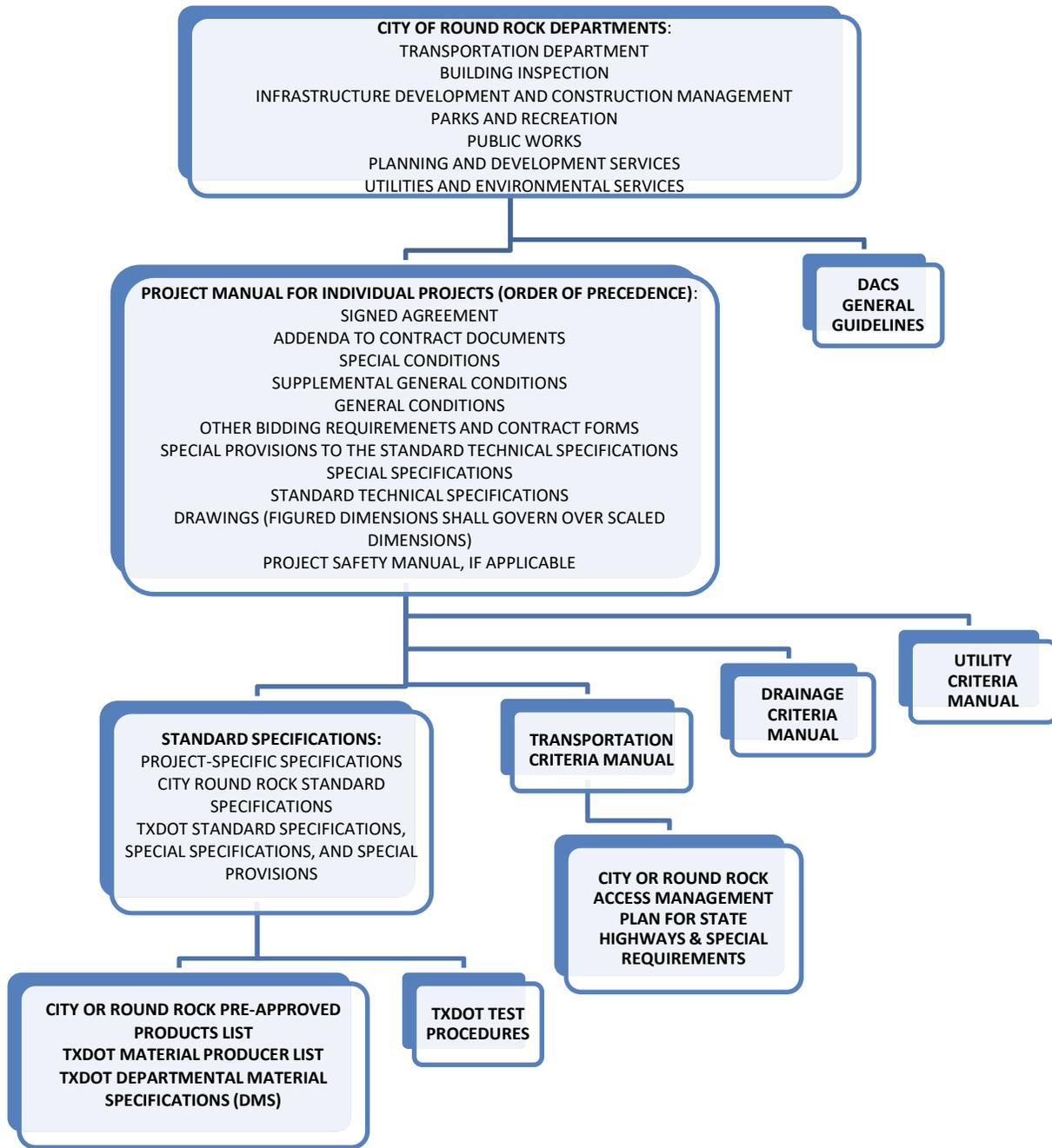


Figure 1: DACS ORGANIZATION AND REFERENCES

SECTION 0.1 – DESIGN CRITERIA – GENERAL GUIDELINES

0.101 REFERENCE STANDARDS

The most current version of the references in APPENDIX I may be used along with engineering judgment to justify waivers from the criteria outlined below in support of the Vision and Goals of the Transportation Criteria Manual. Inconsistencies between references shall be resolved by the Transportation Director.

0.102 SPECIFIC DESIGN CRITERIA

Transportation projects shall be developed in accordance with the design criteria in the Transportation Criteria Manual, the references listed in APPENDIX I, City Ordinances, and accepted industry practice. Future maintenance and operational concerns shall also be considered.

The following Manuals are to be included and referenced during project development within the City of Round Rock and Extraterritorial Jurisdiction. The Design Criteria, Specifications, and Construction Details shall govern the design and construction of all projects within the City. Where there is any conflict between any of the criteria in the Manuals listed below and other criteria contained herein, whichever imposes the more stringent shall control.

- Transportation Criteria Manual;
- Drainage Specifications (Drainage Criteria Manual);
- Utility Specifications (Utilities Criteria Manual); and,
- City of Round Rock and TxDOT Specifications.

The following planning documents shall be used in conjunction with the reference documents to develop projects in the City:

- Transportation Master Plan;
- Access Management Plan for State Highways and Special Requirements;
- Transit Plan;
- Development Code; and,
- Downtown Master Plan.

Refer to the City's website or appropriate City Department for the current version of these plans. Also, refer to the Bibliography of the Transportation Criteria Manual for further information.

0.103 DESIGN EXCEPTIONS AND DESIGN WAIVERS

Once the appropriate functional classification and design criteria have been established for a transportation project, it is important to maintain consistent criteria throughout the project limits. When certain design criteria cannot be achieved, a design exception or waiver request is used to evaluate, document, and approve the request.

The design of transportation projects shall conform to the approved design criteria for the appropriate roadway classification, whenever possible; however, in some situations, achieving conformance with all design criteria is not practical or reasonable.

A design exception request and approval is required whenever the criteria for certain controlling criteria specified for a project are not met. The following controlling criteria will require a design exception:

- Design Speed;
- Lane Width;
- Shoulder Width;
- Horizontal Curve Radius;
- Superelevation rate;
- Stopping Sight Distance (SSD);
- Maximum Grade;
- Cross Slope;
- Vertical Clearance; and,
- Design Loading Structural Capacity.

The SSD applies to horizontal alignments and vertical alignments except for sag vertical curves for roadway facilities with continuous street lighting.

A design waiver request and approval is required when criteria in a non-controlling category is not met.

- Curb Parking Lane Width;
- Speed Change (refuge) Lane Width;
- Length of Speed Change Lanes;
- Curb Offset;
- Median Opening Width;
- Horizontal Clearance (clear zone);
- Railroad Overpass Geometrics; and,
- Guardrail Length (Length of Need).

0.104 DESIGN VARIANCES (ADAAG/TAS)

A design variance is required whenever the design guidelines specified in the Americans with Disabilities Act Accessibility Guidelines (ADAAG) and the Texas Accessibility Standards are not met. Design variances should be sent to the Texas Department of Licensing and Regulation (TDLR) for approval prior to incorporating into the project design. The Project Engineer is responsible for obtaining the approval; however, granting of design variances is rare, and every effort should be made to comply with the requirements.

0.105 DESIGN DOCUMENTATION FOR DESIGN EXCEPTIONS AND WAIVERS

Design exception and design waiver requests shall be submitted for review and approval by the Transportation Director prior to incorporating into the final design of a transportation project.

The request and supporting documentation shall be submitted prior to, or concurrently with the 30% design submittal; or, as soon as the need for one is identified.

The following is the minimum information necessary to justify the need for a design exception or waiver:

- Specific design criteria that will not be met;
- Existing roadway characteristics;
- Alternatives considered;
- Comparison of the safety and operational performance of the roadway and other impacts such as right-of-way, community, environmental, cost, and usability by all modes of transportation;
- Proposed mitigation measures; and,
- Compatibility with adjacent sections of roadway.

0.106 PROJECT ENGINEER RESPONSIBILITIES

The Project Engineer, also referred to as the Engineer of Record, the Engineer/Architect, or the Project Manager shall have the following responsibilities:

- Serve as the primary point of contact between the City and the Engineering/Architectural Consultant firm;
- Prepare and distribute all project correspondence including letters, submittal packages, and meeting minutes;
- Review Contractor Submittals and Working Drawings;
- Attend the pre-construction meeting and distribute meeting minutes;
- Ensure all required permits and necessary third party agency reviews have been completed prior to releasing the project manual and drawings for bidding; and,
- Present a written notice to the City that the project is substantially complete and ready for final project walk through.

SECTION 0.2 – CONSTRUCTION – GENERAL GUIDELINES

0.201 PRE-APPROVED PRODUCTS LIST

The City maintains a Pre-Approved Products List (www.roundrocktexas.gov) for use in developing plans and specifications for private development and Capital Improvement Projects (CIPs). The current version shall be used, as the City anticipates adding or removing items as necessary.

TxDOT maintains a Material Producer List with products, materials, producers, manufacturers, and producer codes for pre-approved items meeting TxDOT Specifications.

Where conflicts or discrepancies exist between the City’s Pre-Approved Products List and TxDOT’s Material Producer list, priority shall be given to the City’s List.

The Project Engineer shall obtain approval from the Transportation Director prior to incorporating non-approved items into a project.

0.202 AUTHORITY AND DEFINITIONS – TRANSPORTATION PROJECTS

The City of Round Rock Transportation Director or their designee shall have the authority to review and approve design exceptions or design variances to the transportation design criteria in the Transportation Criteria Manual.

Specifications shall mean the following:

- Any project-specific specifications listed or referenced in the bid documents;
- City of Round Rock Standard Specifications listed in the bid documents; and,
- Texas Department of Transportation “Standard Specifications for Construction and Maintenance of Highways, Streets, and Bridges” latest edition, with current Special Provisions and Special Specifications, incorporated by reference.

Refer to TxDOT Standard Specifications, Item 1 for additional Abbreviations and Definitions.

“Engineer” where used in the contract documents and specifications shall mean the City of Round Rock Transportation Director or their designee. The Engineer has the authority to observe, test, inspect, approve, and accept the work. The Engineer decides all questions about the quality and acceptability of materials, work performed, work progress, Contract interpretations, and acceptable Contract fulfillment. The Engineer has the authority to enforce and make effective these decisions.

“Design Engineer” where used in the contract documents shall mean the Professional Engineer licensed in the State of Texas who signed and sealed the contract documents.

0.203 PRE-CONSTRUCTION MEETING

Prior to the start of any construction project, the City and the Contractor shall hold a pre-construction meeting. Attendance at the pre-construction meeting is required for the following:

- City Project Manager;
- City Construction Inspector(s);
- Project Engineer or Architect, or Consultant’s Project Manager;
- Contractor and major subcontractors; and,
- TxDOT, Williamson County, or MUD representative, if applicable.

0.204 CONTRACTOR SUBMITTALS AND WORKING DRAWINGS

This section addresses Contractor Submittals and Working Drawings (also called “shop drawings”) to be submitted and reviewed by the City or the Project Engineer during the construction phase of a project. The Contractor shall submit the Contractor Submittals and

Working Drawings to supplement the plans with all necessary details not included on the Contract plans. The Contractor will prepare and furnish working drawings in a timely manner and obtain approval, if required, before the beginning of the associated work. The Contractor shall have a licensed professional engineer sign, seal, and date the working drawings as indicated in Table 1.

The routing of submittals for review and approval will be established at the preconstruction conference. The Contractor is responsible for the accuracy, coordination, and conformity of the various components and details of the working drawings, including subcontractors. City approval of the Contractor’s working drawings will not relieve the Contractor of any responsibility under the Contract. The work performed will not be measured or paid for directly but will be subsidiary to pertinent Items.

The Contractor and the City shall agree on the appropriate number of copies to be submitted during the preconstruction conference.

Submittals shall be consecutively numbered by the Contractor. A resubmittal, if required, shall retain the original submittal number and shall be appended with an “R”.

**Table 1
Signature and Approval Requirements for Working Drawings**

Working Drawings For		Requires Licensed Professional Engineer’s Signature, Seal, and Date	Requires City Approval
1. Alternate or optional designs submitted by Contractor		Yes	Yes
2. Supplementary shop and fabrication drawings for structural Items		No unless required on the plans	See applicable Item
3. Contractor-proposed temporary facilities that affect the public safety, not included on the plans		Yes	Yes
4. Form and falsework details	Bridges, retaining walls, and other major structures	Yes unless otherwise shown on the plans	No ^{1,2}
	Minor structures	No unless otherwise shown on the plans	No
5. Erection drawings		Yes	No ^{1,2}
6. Contractor-proposed major modifications to traffic control plan		Yes	Yes

1. The Engineer may require that the Contractor have a licensed professional engineer certify that the temporary works are constructed according to the sealed drawings.
2. Approval is required for items spanning over live traffic or where safety of the traveling public is affected, in the opinion of the Engineer.

The Contractor shall provide all submittals required by the Contract Documents and Specifications. The following shall be provided before or at the pre-construction conference:

- Engineered Trench Safety Plan;
- Engineered Traffic Control Plan;
- Storm Water Pollution Prevention Plan (SWPPP), required if project area is more than one (1) acre;

- Notice of Intent (NOI), required if project area is more than five (5) acres; and,
- Utility Locates: provide evidence of contact with Texas One Call Center

The following requirements pertain to Contractor submittals:

- Use 8-1/2"x11" or 11"x17" size paper;
- Maintain a submittal log and make available to the City;
- Consecutively number and include the Contractor's stamp;
- Be signed and sealed by a Professional Engineer where required by the Specifications;
- Allow sufficient time for review by the City.

0.205 CONSTRUCTION PLAN PREPARATION AND CHECKLISTS

The Project Engineer shall prepare the project General Notes using the current City of Round Rock Template. The General Notes shall be included in the Project Manual in Section 00900 "Special Conditions" and in the plan set.

Transportation plan sets shall be prepared in accordance with the guidance and appropriate checklists included in the Transportation Criteria Manual Section 9 – "Plan Preparation".

Table of Contents

List of Tables 1-2

List of Figures 1-3

SECTION 1 – STREET DESIGN CRITERIA 1-4

1.1 GENERAL 1-4

 1.1.1 Reference Standards..... 1-5

1.2 STREET CLASSIFICATIONS..... 1-5

1.3 RIGHT OF WAY, STREET AND LANE WIDTHS..... 1-10

1.4 SINGLE OUTLET STREETS..... 1-10

1.5 HORIZONTAL AND VERTICAL ALIGNMENT 1-10

 1.5.1 Horizontal Alignment 1-10

 1.5.2 Vertical Alignment 1-11

1.6 INTERSECTIONS 1-12

 1.6.1 Angles 1-12

 1.6.2 Spacing and Offsets 1-12

 1.6.3 Corner Radii 1-12

 1.6.4 Vertical Alignment within the Intersection Area 1-13

 1.6.5 Horizontal Alignment within the Intersection Area 1-13

1.7 CUL-DE-SAC 1-13

1.8 SIGHT DISTANCE CRITERIA..... 1-13

 1.8.1 Horizontal Stopping Sight Distance 1-13

 1.8.2 Minimum Sight Distance for Signal Visibility 1-14

 1.8.3 Intersection Sight Distance 1-14

1.9 CLEAR ZONES AND PROTECTION 1-15

 1.9.1 Clear Zone Criteria 1-15

 1.9.2 Types of Barriers 1-16

 1.9.3 Transportation Guidelines for Landscaping 1-16

1.10 TAPER TERMINOLOGY 1-19

1.11 STREET WIDTH TRANSITION TAPERS 1-19

1.12 LEFT TURN LANES 1-19

 1.12.1 Approach Tapers 1-19

 1.12.2 Bay Tapers 1-20

 1.12.3 Deceleration Length..... 1-20

 1.12.4 Storage Length 1-20

 1.12.5 Departure Taper Length..... 1-21

1.13 RIGHT-TURN/DECELERATION LANES 1-21

1.14 TURN LANE WARRANTS..... 1-21

1.15 MEDIANS..... 1-22

1.16 DRAINAGE STRUCTURES 1-24

1.17 PAVEMENT CROSS SLOPE 1-24

List of Tables

Table 1-1a: Geometric Criteria - Local Streets 1-7

Table 1-1b: Geometric Criteria – Collector Streets 1-8

Table 1-1c: Geometric Criteria – Arterial Streets 1-9

Table 1-2: Single Outlet Streets 1-10

Table 1-3: Side Friction Factors 1-11

Table 1-4: Minimum Stopping Sight Distance Including Brake Reaction Distance and Braking
Distance (ft)..... 1-14

Table 1-5: Minimum Setback Requirements For Existing And Newly Planted Trees 1-17

Table 1-6: Lateral Clearance On Cut And Fill Sections Roadways With Shoulders (Feet)..... 1-18

Table 1-7: Deceleration Length 1-20

Table 1-8: Queue Storage Length 1-21

Table 1-9: Median Opening Criteria (Refer to Figure 1-19) 1-22

Table 1-10: Required Control Radii 1-23